

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 06-059498

(43)Date of publication of application : 04.03.1994

(51)Int.Cl.

G03G 9/08

G03G 9/083

(21)Application number : 03-215863

(71)Applicant : RICOH CO LTD

(22)Date of filing : 01.08.1991

(72)Inventor : HASEGAWA SATOSHI

TOSAKA HACHIRO

MATSUI AKIO

TOMITA KUNIHIKO

SUGIMOTO SHOICHI

(54) ELECTROSTATIC CHARGE IMAGE DEVELOPING TONER

(57)Abstract:

PURPOSE: To prevent the roughening of surface by improving the fluidity of toner and suppressing the sticking of toner to a transportation controlling member such as a carrier having a function for imparting triboelectrification a sleeve, a doctor blade or to another triboelectrification imparting member.

CONSTITUTION: In a two-component developer composed of the toner and the carrier and an one-component developer containing a magnetic material therein, (1) a metallic salt of a fatty acid having $\leq 1\%$ free fatty acid content and/or fatty acid amide are incorporated in the toner in the electrophotographic toner composed of a binding resin, a colorant and a charge controlling agent. (2) A metallic salt of a fatty acid having $\geq 145^{\circ}\text{C}$ m.p. and/or fatty acid amide are incorporated in the toner in the electrophotographic toner composed of the binding resin, the colorant and the charge controlling agent.

LEGAL STATUS

[Date of request for examination] 31.07.1998

[Date of sending the examiner's decision of rejection] 27.06.2000

[Kind of final disposal of application other than

the examiner's decision of rejection or
application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's
decision of rejection]

[Date of requesting appeal against examiner's
decision of rejection]

[Date of extinction of right]

* NOTICES *

JPO and INPIT are not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

CLAIMS

[Claim(s)]

[Claim 1] The toner for electrostatic-charge image development characterized by containing the fatty-acid metal salt and/or fatty-acid amide of 1% or less of free fatty acid content in the toner for electrophotography which consists of binding resin, a coloring agent, and an electric charge control agent at least.

[Claim 2] It sets to the toner for electrophotography which consists of binding resin, a coloring agent, and an electrostatic control agent at least, and is the melting point in a toner. Toner for electrostatic-charge image development characterized by containing a fatty-acid metal salt and/or a fatty-acid amide 145 degrees C or more.

[Claim 3] Claim 1 characterized by containing a magnetic component in said toner, or the toner for electrostatic-charge image development according to claim 2.

[Translation done.]

* NOTICES *

JPO and INPIT are not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the toner for electrostatic-charge image development used for a xerography, an electrostatic printing method, etc.

[0002]

[The conventional invention] The approach of developing an electrostatic-charge image using a toner is divided roughly, and has an approach using the so-called binary system developer which a toner and a carrier are mixed and changes, and an approach using the one component system developer used by the toner independent, without being mixed with a carrier. The former approach is that by which the electrostatic-charge image which you make it each charged in a mutually different polarity, and has antipole nature with this electrified toner by carrying out churning friction of a toner and the carrier is visualized. According to the class of a toner and carrier Although there are the magnet brush method using an iron powder carrier, cascade process using a bead carrier, the fur brush method, etc., it is common in this to use an iron powder carrier (iron powder carrier who covered resin if needed).

[0003] In the developer for 2 **, if toner SUPENTO happens to a carrier, the amount of electrifications of a developer will become low. When filming of a toner furthermore happens to a photo conductor, the natural complexion section potential of a photo conductor becomes high, and there is a problem of natural complexion dirt being generated. Then, preventing the above-mentioned phenomenon is performed by adding metallic soap to a toner. However, since metallic soap is hygroscopic in a high humidity ambient atmosphere, the toner which added this has the fault that the amount of electrifications in high humidity falls sharply compared with damp and normal relative humidity, even when what kind of frictional electrification grant member is used. Then, although suppressing the fault by giving the silicone resin coat which contain an amino silane coupling agent for a carrier be propose by the JP,1-28865,A official report, it be cost quantity, and the fluidity of a toner fall during repetition use for a long period of time, and it become the cause of frictional electrification with the carrier in the inside of a developer tank no longer being perform fully, and a toner adhering, fixing to a photo conductor, a development sleeve, a cleaning blade, etc., and generating the greasing of an image again.

[0004] The various proposals of the development approach using the one component system developer which consists only of a toner are made to the binary system developer which has degradation of a carrier potentially, and practical use is presented with the approach using the developer which consists of the toner particle which has magnetism especially comparatively widely. For example, the high resistance magnetism toner used in this approach carries out frictional electrification of the toner particle by friction with a toner layer-thickness-regulation member and a toner particle, and developing an electrostatic-charge latent image is known. In the one component system developer which contains the magnetic component in a toner, since a carrier is not used, though toner SUPENTO does not happen to a carrier, the same problem as the above-mentioned binary system developer generates others. Although adding a fatty-acid metal salt and/or a fatty-acid amide in a JP,59-137955,A official report is proposed by this solution, if use is repeated over a long period of time, a fluidity will fall and the natural

complexion dirt of an image will be generated too. Since a toner layer-thickness-regulation member carries out a role important for electrification of a toner especially, the dirt of a toner layer-thickness-regulation member is fatal.

[0005]

[Problem(s) to be Solved by the Invention] It is in the purpose of this invention canceling the above-mentioned conventional fault, and is in preventing that a toner fixes to conveyance specification-part material, such as a carrier who gives frictional electrification to the frictional electrification grant member which has a function for improving the fluidity of a toner and giving frictional electrification especially, for example, a toner, and a sleeve, a doctor blade, or other frictional electrification grant members, and the natural complexion of an image becomes dirty.

[0006]

[Means for Solving the Problem] In the one component system developer which contains in it the binary system developer and the polar ingredient with which this invention consists of a toner and a carrier the inside of a toner -- (1) -- making the fatty-acid metal salt and/or fatty-acid amide of 1% or less of free fatty acid content contain in the toner for electrophotography which consists of binding resin, a coloring agent, and an electric charge control agent at least -- (2) It sets to the toner for electrophotography which consists of binding resin, a coloring agent, and an electrostatic control agent at least, and is the melting point in a toner. Said technical problem is solved by making a fatty-acid metal salt and/or a fatty-acid amide 145 degrees C or more contain.

[0007] In this invention toner, using the thing of 1% or less of free fatty acid content of a fatty-acid metal salt and/or a fatty-acid amide is based on the following reason. That is, if a collision of a repeat toner comrade starts the toner in a development counter by the conveyance member by carrying out long duration image formation, friction and shearing force will act on the fatty-acid metal salt which exists near a toner front face, and/or a fatty-acid amide, and it will generate heat partially, and it dissolves. By it, the cohesive force between toners becomes strong and a fluidity is reduced. Artificers tend to make a higher thing, as for a fatty-acid metal salt and/or a fatty-acid amide, increase [content / free fatty acid] whenever [between toners / condensation] that it is easy to dissolve.

[0008] Moreover, in this invention, when it was also considered to be the same reason as the above-mentioned that the melting point of a fatty-acid metal salt and/or a fatty-acid amide used a thing 145 degrees C or more and it used the fatty-acid metal salt with a melting point of 145 degrees C or more, it found out that it passed compared with a thing 145 degrees C or less, and whenever [in the time / condensation] could be reduced.

[0009] As binding resin used for this invention, polystyrene, Pori p-chloro styrene, Styrene, such as polyvinyl toluene, and the single polymer of the substitution product; A styrene-p-chloro styrene copolymer, A styrene-propylene copolymer, a styrene-vinyltoluene copolymer, A styrene-vinyl naphthalene copolymer, a styrene-methyl-acrylate copolymer, A styrene-ethyl-acrylate copolymer; a styrene-butyl acrylate copolymer, A styrene-acrylic-acid octyl copolymer, a styrene-methyl-methacrylate copolymer, A styrene-ethyl methacrylate copolymer, a styrene-methacrylic-acid butyl copolymer, A styrene-alpha-Krol methyl-methacrylate copolymer, a styrene acrylonitrile copolymer, A styrene-vinyl methyl ether copolymer, a styrene-vinyl ethyl ether copolymer, A styrene-vinyl methyl ketone copolymer, a styrene-butadiene copolymer, A styrene-isoprene copolymer, a styrene-acrylonitrile-indene copolymer, Styrene system copolymers, such as a styrene-maleic-acid copolymer and a styrene-maleate copolymer; Polymethylmethacrylate, Poly butyl methacrylate, a polyvinyl chloride, polyvinyl acetate, polyethylene, Polypropylene, polyester, polyurethane, a polyamide, an epoxy resin, a polyvinyl butyral, polyacrylic resin, rosin, denaturation rosin, terpene resin, phenol resin, aliphatic series or alicycle group hydrocarbon resin, aromatic series system petroleum resin, chlorinated paraffin, paraffin wax, etc. are mentioned, and independent -- or it can be mixed and used.

[0010] moreover -- especially -- a pressure -- a law -- the following are independent when an example is given as suitable binding resin for wear -- or it can be mixed and used. a **** bee and polyolefine (low molecular weight polyethylene and low molecular weight polypropylene --) Epoxy resins, such as oxidization polyethylene poly 4 fluoridation ethylene, BORIESUTERU resin, A styrene-butadiene

copolymer (monomer ratio 5- 30:95-70), an olefine copolymer (an ethylene-acrylic-acid copolymer and an ethylene-acrylic ester copolymer --) An ethylene-methacrylic-acid copolymer, an ethylene-ground TAKURIRU acid ester copolymer, An ethylene-vinyl chloride copolymer, an ethylene-vinylacetate copolymer, ionomer resin, a polyvinyl pyrrolidone, a methyl BINIRI ether-maleic-anhydride copolymer, maleic-acid denaturation phenol resin, phenol denaturation terpene resin, etc.

[0011] As an electric charge control agent used into this invention toner, tetra-phenyl boron derivatives, such as a metal complex of a monoazo color, tetra-phenyl boron sodium, and a potassium, etc. are raised as what is controlled to positive triboelectric charging as what controls toners, such as quarternary ammonium salt and other organic substances electron-donative [basic], to negative triboelectric charging. The amount made to contain in a toner is 1 - 10 weight section to binding resin.

[0012] The alloy of a metal like the aluminum of ferrous oxide, such as magnetite, hematite, and a ferrite, iron, cobalt, metals like nickel, or these metals, cobalt, copper, lead, magnesium, tin, zinc, antimony, beryllium, a bismuth, cadmium, calcium, manganese, a selenium, titanium, a tungsten, and vanadium as a magnetic material contained in the magnetic toner of this invention, its mixture, etc. are mentioned. as the amount which these ferromagnetics have that desirable whose mean particle diameter is about 0.1-2 micrometers, and is made to contain in a toner -- resinous principle 100 length **** -- receiving -- the about 20 to 200 weight section -- it is the 40 - 150 weight section to the resinous principle 100 weight section especially preferably.

[0013] Moreover, the toner of this invention may mix an additive if needed. As an additive, there are fixing assistants, such as electro-conductivity applying agents, such as fluid grant agents, such as colloidal silica and an aluminum oxide, a caking inhibitor or carbon black, and tin oxide, or low-molecular-weight polyolefine, etc., for example.

[0014] In order to distribute in a toner the fatty-acid metal salt used for this invention, after mixing other components and forming a toner particle beforehand, a Henschel mixer etc. can perform. In this way, homogeneity distributes in a toner, adhesion of the toner to the member which gives a friction charge to a toner is reduced or prevented, and the clear image of the quality of an excellent article is offered over a long period of time, without causing a stripe, fogging, etc.

[0015] As a fatty-acid metal salt, barium stearate, calcium stearate, Zinc stearate, aluminum stearate, magnesium stearate, Although there are lithium stearate, lead stearate, lauric-acid barium, lauric-acid calcium, lauric-acid zinc, lauric-acid magnesium, a lauric-acid lithium, lauric-acid lead, BAL MICHIN acid calcium, BAL MICHIN acid magnesium, dibasicity lead stearate, etc. among these, as a thing of 1% or less of isolation fat content Barium stearate, calcium stearate, lithium stearate, lauric-acid barium, lauric-acid calcium, a lauric-acid lithium, lauric-acid lead, palmitic-acid calcium, and dibasicity lead stearate are mentioned. Steer ** N acid calcium, barium stearate, lithium stearate, lauric-acid barium, etc. are especially desirable.

[0016] Moreover, as a thing with a melting point of 145 degrees C or more, barium stearate, calcium stearate, aluminum stearate, magnesium stearate, lithium stearate, lauric-acid barium, lauric-acid calcium, lauric-acid magnesium, a lauric-acid lithium, lauric-acid lead, palmitic-acid calcium, palmitic-acid magnesium, and dibasicity lead stearate are mentioned among these. As a fatty-acid amide, octadecanamide, a lauric-acid amide, a palmitic-acid amide, Oleic amide, a linolic acid amide, oxy-octadecanamide, An erucic-acid amide, a behenic acid amide, ethylene screw octadecanamide, Ethylene screw oleic amide, methylenebis octadecanamide, An ethylene screw lauric-acid amide, hexa methylenebis octadecanamide, There were hexamethylene BISURAU rail octadecanamide N and N-JISUTEA phosphorus adipic-acid amide, butylene screw octadecanamide, etc., and in this invention, in quest of the acid number, free fatty acid content was calculated by acid-number measurement of a fats and fatty oils test, and it was used, having chosen the thing of 1% or less of free fatty acid. Moreover, it was used among these fatty-acids amides, having chosen the thing with a melting point of 145 degrees C.

[0017] As for the addition of these fatty-acids metal salt and/or a fatty-acid amide, it is desirable to contain 0.01 to 5% of the weight. Effectiveness is not enough in it being 0.01 or less % of the weight, and the purpose of this invention cannot be attained. Moreover, if it exceeds 5 % of the weight, a fluid

fall and the fall of image concentration will be caused that it is easy to produce adhesion of the toner to a sleeve etc.

[0018] It measured whenever [condensation] as a means to evaluate a fluidity, and the change condition estimated. Measurement calculated (%) whenever [condensation] by attaching and adding the weight of 5:3:1 to the amount of toners which remained on each mesh, when a 2g toner was put on descending of an opening at three kinds of mesh, 75 micrometers, 45 micrometers, and 22 micrometers, and a fixed vibration was added for 30 seconds using the Hosokawa Micron powder circuit tester. A formula sets to c the amount of toners which remained the amount of toners which remained the amount of toners (g) which remained in a 75-micrometer mesh in a and a 45-micrometer mesh in b and a 22-micrometer mesh, and is shown by the following equations.

It is (%) = $10 \times (3x_a + 3x_b + c)$ whenever [condensation].

[0019] When using the toner of this invention as binary system and a developer, as a carrier, all well-known carriers are usable, and particles, such as glass and silicon carbide, are further used for the particle of metals, such as iron, nickel, and aluminum, and *****, a metallic oxide, and the metallic compounds containing ***** etc. Moreover, the various alloys in which strong magnetism is shown are effectively used by performing some processings, such as alloys containing the element in which the ferromagnetism of cobalt, nickel, etc. is shown including iron, such as the matter magnetized in the direction very strongly by the magnetic field as a magnetic particle used for the one component system developer containing the magnetic component of this invention, for example, a ferrite, and magnetite, or a compound, and other heat treatments. these ferromagnetics are contained in a toner -- making -- it is good it to be desirable to make mean particle diameter into an about 0.1-3-micrometer particle, and to make it become 15 - 60 % of the weight into a toner.

[0020]

[Example] Although the fundamental configuration and the fundamental special feature of this invention were described above, this invention is further explained based on an example below.

Example 1 styrene-n-butyl methacrylate 100 section carbon black 10 section release agent (low-molecular, polyethylene) 2 section electric charge control agent (metal-containing complex salt) After carrying out churning mixing of the mixture of the 2 section above-mentioned presentation enough in a Henschel mixer, heating fusion was carried out for about 30 minutes at the temperature of 130-140 degrees C by the roll mill, grinding classification of the kneading object obtained after cooling to the room temperature was carried out, and the toner with a particle size of 5-10 micrometers was obtained. In addition, it mixed with the Henschel mixer, and the toner of this invention was obtained so that a content might serve as 1 weight section in hydrophobic silica impalpable powder and might furthermore serve as this toner calcium stearate (free fatty acid content about 0.5%) with 1 % of the weight. The ferrous-oxide powder carrier (EFV 200/300; Japanese iron powder company make) 97.5 section of 100-250 meshes which covered silicone resin was mixed with the ball mill to this toner 2.5 section, and the developer was obtained. Next, about the above-mentioned developer, it is the Ricoh make. It set to FT4060 and image **** was performed. The obtained image had concentration as high as 1.50, and was a quality image of fogging and a stripe which is not. When 10,000 sheets are furthermore copied continuously, there are not an early image and inferiority, and toner fixing to a sleeve or a toner layer-thickness-regulation member and filming to a photo conductor were not seen, either. Although image concentration decreased a little with 1.42, it maintained the high concentration image enough. The high fluidity was maintained although whenever [place / which measured whenever / condensation / which is a fluid scale / by the following approach /, and condensation] increased 8.6 to 11.0%, and a little after the 10,000-sheet copy copy before.

[0021] Image **** was carried out using the toner which barium stearate (free fatty acid content 0.5%) was added 1% of the weight instead of the calcium stearate of example 2 example 1, and also was produced by the same formula as the toner of an example 1, and the approach. The obtained image had concentration as high as 1.52, and was a quality image of fogging and a stripe which is not. When 10,000 sheets are furthermore copied continuously, there are not an early image and inferiority, and toner fixing to a sleeve and filming to a photo conductor were not seen, either. Although it decreased a

little with image concentration 1.43, the high concentration image was maintained enough. Whenever [condensation / which is a fluid scale], although change increased from 8.8% with 13.% before and after the copy of 10,000 sheets, it maintained the high fluidity.

[0022] Although the good image was obtained by high image concentration (1.51) in the first stage when image **** was performed using the toner which example of comparison 1 calcium stearate was not added, and also was produced by the same formula of an example 1, and the approach, after the 10,000-sheet copy, image quality deteriorated remarkably and filming to a photo conductor was seen for a stripe and fogging arising etc.

[0023] When image **** was performed using the toner which aluminum stearate (free fatty acid content 22%) was added 1% of the weight instead of example of comparison 2 calcium stearate, and also was produced by the same formula as the toner of an example 1, and the approach, in the first stage, high image concentration (1.45) and a quality image were able to be obtained, but after the copy of 10,000 sheets, although image quality is good, image concentration has fallen to 1.07. Whenever [condensation] increased to 40% from 9.2% before and after the copy.

[0024] Image **** was performed using the toner which octadecanamide (0.8% of free fatty acid content) was added 1% of the weight instead of the calcium stearate of example 3 example 1, and also was produced by the same formula as the toner of an example 1, and the approach. The obtained image had concentration as high as 1.51, and was a quality image of fogging and a stripe which is not. When it furthermore copies 10,000 continuation, there are not an early image and inferiority, and toner fixing to a sleeve and filming to a photo conductor were not seen, either. Although image concentration decreased a little with 1.45, it maintained the high concentration image enough. Whenever [condensation / which is a fluid scale], although change increased with 8.2 to 10.8% before and after the copy of 10,000 sheets, it maintained the high fluidity.

[0025] Image **** was performed using the toner which the erucic-acid amide (free fatty acid content 0.8%) was added 1% of the weight instead of example 4 octadecanamide, and also was produced by the same formula as the toner of an example 3, and the approach. The obtained image had concentration as high as 1.47, and was a quality image of fogging and a stripe which is not. Continuously, when [of 10,000 sheets] it copies, an early image and inferiority are not still, and toner fixing to a sleeve or a toner layer-thickness-regulation member and filming to a photo conductor were not seen, either. Although image concentration decreased a little with 1.39, it maintained the high concentration image enough. Whenever [condensation / which is a fluid scale], although change increased with 10.8 to 15.0% before and after the copy of 10,000 sheets, it maintained the high fluidity.

[0026] Although it was able to put having performed image **** using the toner which oleic amide (free fatty acid content 5%) was added 1% of the weight instead of example of comparison 3 octadecanamide, and also was produced by the same formula as the toner of an example 3, and the approach, and high image concentration (1.45) and a quality image were able to be obtained in the first stage, and the image is good after the copy of 10,000 sheets, image concentration has fallen to 1.17. Whenever [condensation] increased to 40% from 11.2% before and after the copy.

[0027] An example 5 Styrene-butyl methacrylate copolymerization object The 100 weight sections Carbon black Ten weight sections A release agent (low-molecular polypropylene) 2 weight section Electric charge control agent (auriferous group complex salt) After mixing the matter more than 2 weight sections enough with a blender, it kneaded with 2 rolls heated at 120-140 degrees C. Coarse grinding of the kneading object was carried out by the cutter mill after natural radiationnal cooling, and the magnetic toner with a mean particle diameter of 5-20 micrometers was obtained after grinding using pneumatic elutriation with the pulverizer using a jet stream. In addition, it mixed with the Henschel mixer, and the toner of this invention was obtained so that a content might serve as 1 weight section in hydrophobic silica impalpable powder and might furthermore serve as this toner lithium stearate (melting point 220 degrees C) with 1 % of the weight. The ferrite carrier 97.5 section of 100-250 meshes which covered silicone resin was mixed with the ball mill to this toner 2.5 section, and the developer was obtained. Image **** was performed like the example 1. The obtained image had concentration as high as 1.50, and was a quality image of fogging and a stripe which is not. When 10,000 sheets are

furthermore copied continuously, there are not an early image and inferiority, and toner fixing to a sleeve or a toner layer-thickness-regulation member and filming to a photo conductor were not seen, either. Although image concentration decreased a little with 1.42, it maintained the high concentration image enough. The high fluidity was maintained although whenever [place / which measured whenever / condensation / which is a fluid scale / by the following approach /, and condensation] increased 10,000 by copy before with 8.6 to 11.0% after *****.

[0028] When image **** was carried out using the toner which palmitic-acid KARISHIUMU (melting point 290 degrees C) was added 1% of the weight instead of example 6 calcium stearate, and also was produced by the same formula as the toner of an example 1, and the approach, the obtained image had concentration as high as 1.52, and was a quality image of fogging and a stripe which is not. When 10,000 sheets are furthermore copied continuously, there are not an early image and inferiority, and toner fixing to a sleeve or a toner layer-thickness-regulation member and filming to a photo conductor were not seen, either. Although image concentration decreased a little with 1.43, it maintained the high concentration image enough. Whenever [condensation / which is a fluid scale], although change increased with 8.8 to 13.0% before and after the copy of 10,000, it maintained the high fluidity.

[0029] When image **** was performed using the toner which zinc stearate (melting point abbreviation 120 degrees C) was added 1% of the weight instead of example of comparison 4 calcium stearate, and also was produced by the same formula as the toner of an example 1, and the approach, in the first stage, high image concentration (1.45) and a quality image were able to obtain, but after the copy of 10,000 sheets, although image quality is good, image concentration has fallen to 1.05. Whenever [condensation] was increasing to 30% from 10.5% before and after the copy.

[0030] Image **** was performed using the toner which hexa methylenebis octadecanamide (melting point 146 degrees C) was added 1% of the weight instead of the calcium stearate of example 7 example 1, and also was produced by the same formula as the toner of 1 of an example, and the approach. The obtained image had concentration as high as 1.48, and was a quality image of fogging and a stripe which is not. When 10,000 sheets are furthermore copied continuously, there are not an early image and inferiority, and filming to a sleeve or a photo conductor was not seen, either. Although image concentration decreased a little with 1.42, it maintained the high concentration image enough. Whenever [condensation / which is a fluid scale], although change increased 10.6 to 15.2%, and a little before and after the copy of 10,000, it showed sufficient fluidity.

[0031] Image **** was performed using the toner which the ethylene screw lauric-acid amide (melting point 157 degrees C) was added 1% of the weight instead of example 8 hexa methylenebis octadecanamide, and also was produced by the same formula as the toner of an example 7, and the approach. The obtained image had concentration as high as 1.51, and was a quality image of fogging and a stripe which is not. When 10,000 sheets are furthermore copied continuously, there are not an early image and inferiority, and toner fixing to a sleeve or a toner layer-thickness-regulation member and filming to a photo conductor were not seen, either. Although image concentration decreased a little with 1.45, it maintained the high concentration image enough. Whenever [condensation / which is a fluid scale], although change increased with 8.2 to 10.8% before and after the copy of 10,000, it maintained the fluidity.

[0032] Added the palmitic-acid amide (melting point of about 100 degrees C) 1% of the weight instead of example of comparison 5 hexa methylenebis octadecanamide, and also The same formula as the toner of an example 1, When image **** was performed using the toner produced by the approach, in the first stage, high image concentration (1.45) and a quality image were able to be obtained, but although image quality is good after a 10,000-sheet copy, image concentration has fallen even to 1.05. Whenever [condensation] was increasing to 30% from 10.5% before and after the copy.

[0033] An example 9 Styrene-butyl methacrylate copolymerization object 56 weight sections A release agent (low-molecular polypropylene) Two weight sections An electric charge control agent (metal-containing complex salt) Two weight sections Magnetic substance After mixing the matter more than 40 weight sections enough with a blender, it kneaded with 2 rolls heated at 120-140 degrees C. Coarse grinding of the kneading object was carried out by the cutter mill after natural radiationnal cooling, and

the magnetic toner with a mean particle diameter of 5-20 micrometers was obtained after pulverizing using a jet stream using pneumatic elutriation. In addition, it mixed with the Henschel mixer, and the magnetic toner of this invention was obtained so that a content might serve as 1 weight section in hydrophobic silica impalpable powder and might furthermore serve as calcium stearate (free fatty acid content about 0.5%) this magnetic toner with 1 % of the weight. Subsequently, friction contact to friction contact of the above-mentioned toner particle comrade, a toner particle, and a toner layer-thickness-regulation member and a developer sleeve gave the friction charge to the magnetic toner, the phenomenon of the electrostatic-charge image formed on the organic-semiconductor photo conductor was carried out, the toner image was made, it imprinted in the regular paper and heating fixing was carried out. The obtained image had concentration as high as 1.50, and was a quality image of fogging and a stripe which is not. When 10,000 sheets are furthermore copied continuously, there are not an early image and inferiority, and toner fixing to a sleeve or a toner layer-thickness-regulation member and filming to a photo conductor were not seen, either. Although image concentration decreased a little with 1.42, it maintained the high concentration image enough. Whenever [condensation / which is a fluid scale], although change increased 8.6 to 11.0%, and a little before and after the copy of 10,000 sheets, it maintained the fluidity.

[0034] Image **** was performed using the toner which barium stearate (0.5% of free fatty acid content) was added 1% of the weight instead of example 10 calcium stearate, and also was produced by the same formula as the toner of an example 9, and the approach. The obtained image had concentration as high as 1.52, and was a quality image of fogging and a stripe which is not. When 10,000 sheets are furthermore copied continuously, there are not an early image and inferiority, and toner fixing to a sleeve or a toner layer-thickness-regulation member and filming to a photo conductor were not seen, either. Although image concentration decreased a little with 1.43, it maintained the high concentration image enough. Whenever [condensation / which is a fluid scale], although change increased with 8 to 13.0% before and after the copy of 10,000, it maintained the fluidity.

[0035] Although the good image was able to be obtained by high image concentration (1.51) in the first stage when image **** was performed using the toner which example of comparison 6 calcium stearate was not added, and also was produced by the same formula as the toner of an example 9, and the approach, in a stripe and fogging arising etc., after the 10,000-sheet copy, image quality deteriorated remarkably. The toner had fixed to the toner layer-thickness-regulation member, and filming to a sleeve was also seen.

[0036] When image **** was performed using the toner which aluminum stearate (22% of free fatty acid content) was added 1% of the weight instead of example of comparison 7 calcium stearate, and also was produced by the same formula as the toner of an example 9, and the approach, in the first stage, high image concentration (1.45) and a quality image were able to be obtained, but although image quality is good after a 10,000-sheet copy, image concentration has fallen even to 1.07. Whenever [condensation] increased to 40% from 9.2% before and after the copy.

[0037] Image **** was performed using the toner which octadecanamide (free fatty acid content 0.5%) was added 1% of the weight instead of the calcium stearate of example 11 example 9, and also was produced by the same formula as the toner of an example 9, and the approach. The obtained image had concentration as high as 1.48, and was a quality image of fogging and a stripe which is not. When 10,000 sheets are furthermore copied continuously, there are not an early image and inferiority, and toner fixing to a sleeve or a toner layer-thickness-regulation member and filming to a photo conductor were not seen, either. Although image concentration decreased a little with 1.42, it maintained the high concentration image enough. Change increased 10.6 to 15.2%, and a little before and after the copy of 10,000 whenever [condensation / which is a fluid scale].

[0038] When image **** was carried out using the toner which the erucic-acid amide (0.8% of free fatty acid content) was added 1% of the weight instead of the octadecanamide of example 12 example 11, and also was produced by the same formula as the toner of an example 9, and the approach, the obtained image had concentration as high as 1.52, and was a quality image of fogging and a stripe which is not. When 10,000 sheets are furthermore copied continuously, there are not an early image and inferiority,

and toner fixing to a sleeve or a toner layer-thickness-regulation member and filming to a photo conductor were not seen, either. Although image concentration decreased a little with 1.43, it maintained the high concentration image enough. Whenever [condensation / which is a fluid scale], although change increased with 8.8 to 13.0% before and after the copy of 10,000, it maintained the high fluidity. [0039] Added oleic amide (5% of free fatty acid content) 1% of the weight instead of example of comparison 8 octadecanamide, and also The same formula as the toner of an example 1, When image **** was performed using the toner produced by the approach, in the first stage, high image concentration (1.45) and a quality image were able to be obtained, but although image quality is good after a 10,000-sheet copy, image concentration has fallen even to 1.05. Whenever [condensation] was increasing to 30% from 10.5% before and after the copy.

[0040] An example 13 A styrene-butyl methacrylate copolymerization object 56 weight sections A release agent (low-molecular polypropylene) Two weight sections An electric charge control agent (alloy *****) Two weight sections Magnetic substance After mixing the matter more than 40 weight sections enough with a blender, it kneaded with 2 rolls heated at 120-140 degrees C. Coarse grinding of the kneading object was carried out by the cutter mill after natural radiational cooling, and the magnetic toner with a mean particle diameter of 5-20 micrometers was obtained after grinding using pneumatic elutriation by the pulverizing ability using a jet stream. In addition, it mixed with the Henschel mixer, and the magnetic toner of this invention was obtained so that a content might serve as 1 weight section in hydrophobic silica impalpable powder and might furthermore serve as calcium stearate (melting point 155 degrees C) this magnetic toner with 1 % of the weight. Subsequently, friction contact to friction contact of the above-mentioned toner particle comrade, a toner particle, and a toner layer-thickness-regulation member and a developer sleeve gave the friction charge to the magnetic toner, the electrostatic-charge image formed in organic half **** was developed, the toner image was made, it imprinted in the regular paper and heating fixing was carried out. The obtained image had concentration as high as 1.50, and was a quality image of fogging and a stripe which is not. When 10,000 sheets are furthermore copied continuously, there are not an early image and inferiority, and sleep, toner fixing to a toner layer-thickness-regulation member, and filming to a photo conductor were not seen, either. Although image concentration decreased a little with 1.42, it maintained the high concentration image enough. Whenever [condensation / which is a fluid scale], although change increased 8.6 to 11.0%, and a little before and after the copy of 10,000 sheets, it maintained the high fluidity.

[0041] Image **** was performed using the toner which lithium stearate (melting point 220 degrees C) was added 1% of the weight instead of example 14 calcium stearate, and also was produced by the same formula as the toner of an example 1, and the approach. The obtained image had concentration as high as 1.51, and was a quality image of fogging and a stripe which is not. When 10,000 sheets are furthermore copied continuously, there are not an early image and inferiority, and sleep, toner fixing to a toner layer-thickness-regulation member, and filming to a photo conductor were not seen, either. Although image concentration decreased a little with 1.45, it maintained the high concentration image enough. Although condensation change which is a fluid scale increased with 8.2 to 10.8% before and after the copy of 10,000, it maintained the high fluidity.

[0042] Added steer ** N acid zinc (melting point of about 120 degrees C) 1% of the weight instead of example of comparison 9 calcium stearate, and also The same formula as the toner of an example 1, the place which performed image **** using the toner produced by the approach -- the first stage -- setting - high-definition concentration (1.49) and a quality image -- **** -- although things were made, and high definition is good after the copy of 10,000 sheets, image concentration has fallen even to 1.05. Whenever [condensation] was increasing to 3.0% from 9.2% before and after the copy.

[0043] When image **** is carried out using the toner which hexamethylene octadecanamide (melting point of 146 degrees C) was added 1% of the weight instead of the calcium stearate of example 15 example 13, and also was produced by the same formula as the toner of an example 13, and the approach, there are not an early image and inferiority, and sleep, toner fixing to a toner layer-thickness-regulation member, and filming to a photo conductor were not seen, either. Although image

concentration decreased a little with 1.43, it maintained the high concentration image enough. Although condensation change which is a fluid scale increased with 8.8 to 13.0% before and after the copy of 10,000, it maintained the high fluidity.

[0044] Image **** was performed using the toner which the ECHIRE screw lauric-acid amide (melting point of 157 degrees C) was added 1% of the weight instead of the example 16 hexa methylenebis TEARIN acid amide, and also was produced by the same formula as the toner of an example 13, and the approach. The obtained image had concentration as high as 1.50, and was a quality image of fogging and a stripe which is not. When 10,000 sheets are furthermore copied continuously, there are not an early image and inferiority, and sleep, toner fixing to a toner layer-thickness-regulation member, and filming to a photo conductor were not seen, either. image concentration -- 1.45 -- although it decreased a little, the high concentration image was maintained enough. Whenever [condensation / which is a fluid scale], although change increased 8.2 to 10.8%, and a little before and after the copy of 10,000 sheets, it maintained the high fluidity.

[0045] Added the palmitic-acid amide (melting point of about 100 degrees C) 1% of the weight instead of example of comparison 16 hexa methylenebis octadecanamide, and also The same formula as the toner of an example 13, the place which performed image **** using the toner produced by the approach -- the first stage -- setting -- high-definition concentration (1.45) and a quality image -- **** -- although things were made, and image quality is good after the copy of 10,000 sheets, image concentration has fallen even to 1.05. Whenever [condensation] was increasing to 30% from 10.5% before and after the copy.

[0046]

[Effect of the Invention] Since the fluidity of a toner is held also to the slippage effectiveness and the prolonged repetition which were excellent when the toner of this invention contained a fatty-acid metal salt and/or a fatty-acid amide in a toner as stated above, The carrier which gives frictional electrification to the frictional electrification grant member which has a function for giving frictional electrification, for example, a toner, It can suppress that a toner fixes to conveyance specification-part material, such as a sleeve and a doctor blade, or other frictional electrification grant members, and ***** of an image can be prevented.

[Translation done.]